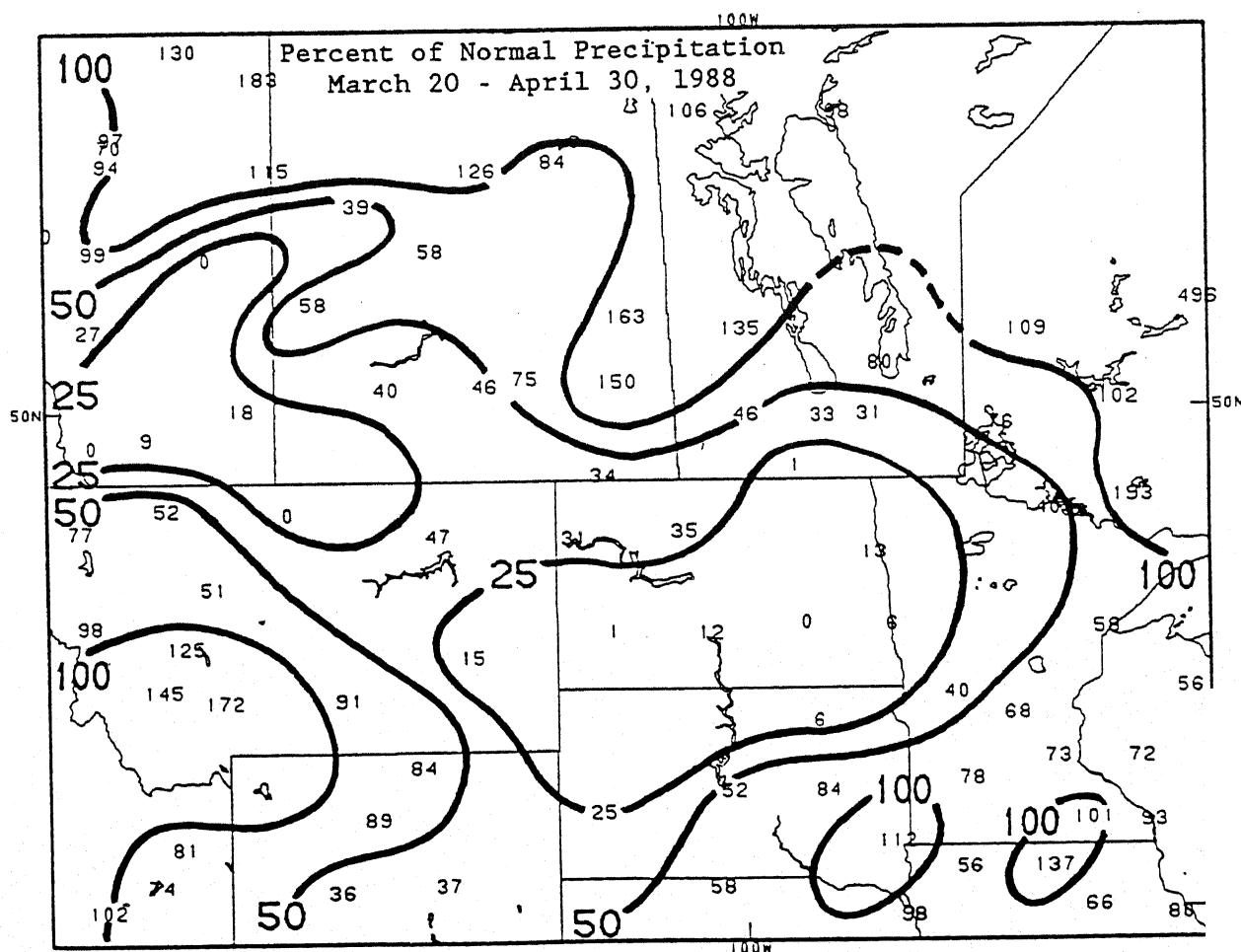


WEEKLY CLIMATE BULLETIN

No. 88/18

Washington, DC

April 30, 1988



PRECIPITATION NORMALLY INCREASES IN THE SPRING AND REACHES A MAXIMUM DURING SUMMER MONTHS IN THE NORTHERN GREAT PLAINS, UPPER MIDWEST, AND SOUTHERN CALIFORNIA. SO FAR THIS SPRING, HOWEVER, PRECIPITATION HAS BEEN RATHER DEFICIENT THROUGH MOST OF THE AREA AS THE GROWING SEASON GETS UNDERWAY. REFER TO THE STATE CLIMATE SUMMARY FOR FURTHER DETAILS.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL SERVICE

GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JANUARY 4, 1992

1. Western North America:

MORE PRECIPITATION ACROSS CALIFORNIA.

Pacific storms again brought moderate to heavy rains (20 - 95 mm) to the Pacific seaboard and heavy snow to the higher elevations, easing moisture shortages. Six-week deficits of 50 - 200 mm, however, still prevailed from northern California into southwestern Canada [9 weeks].

2. North-Central United States and Southwestern Canada:

ABNORMALLY MILD WEATHER PERSISTS.

Temperatures have remained unseasonably high from the Canadian Rockies southeastward into the central Plains and middle Mississippi Valley, averaging more than 6°C above normal since early December. Last week, temperatures soared above 10°C as far north as northern Montana [4 weeks].

3. Central and Southeastern Texas:

RAIN CONTINUES TO AGGRAVATE FLOODING.

Spotty moderate rains of 20 - 50 mm aggravated flooding across southeastern Texas. The Red Cross estimated that 2,500 homes have been damaged by the flooding that began as runoff from heavy rain in north and central Texas poured into the Guadalupe, Trinity, Brazos, and Colorado Rivers. The Brazos River still had not begun to recede at week's end [11 weeks].

4. Mid-Atlantic:

COASTAL STORM CAUSES HEAVY RAIN AND BEACH EROSION.

A powerful coastal storm moved up the Atlantic coast, generating rainfall totals up to 195 mm and hurricane-force wind gusts from the Carolinas to southern New England (see Figure 1). The storm caused extensive damage along the immediate coast as well as widespread beach erosion. The Delaware coast was most severely affected [Episodic Event].

5. Central Gulf Coast, Southeastern Georgia, and Florida:

RAINS RELIEVE DRYNESS ALONG ATLANTIC COAST.

Moderate to heavy rains (25 - 107 mm) fell along Florida's Atlantic coast, easing long-term dryness. Little or no rain, however, fell across the central Gulf Coast, southeastern Georgia and the remainder of Florida, where 50 - 115 mm deficits have accumulated since late November [13 weeks].

6. East-Central South America:

ABNORMALLY WET WEATHER CONTINUES.

Scattered moderate to heavy rainfall (40 - 168 mm) continued to soak parts of southern Brazil, Uruguay, and northeastern Argentina. The wet weather has delayed both harvesting and planting activities, according to press reports [6 weeks]. One downpour generated mudslides that killed 25 people and left hundreds homeless in Rio de Janeiro [Episodic Event].

7. Northeastern and Central Africa and the Middle East:

CHILLY CONDITIONS SPREAD INTO THE PERSIAN GULF AND CENTRAL AFRICA.

Weekly temperatures ranged from 3°C to 8°C below normal from the eastern Mediterranean into central Africa and the Persian Gulf as an unusually severe cold spell continued to grip the region (see page 6), [7 weeks].

8. The Middle East:

HEAVY SNOW BLANKETS MUCH OF THE REGION.

A New Years Day storm that hit the Middle East left roads clogged with snow, cut communications, and forced schools and shops to close (see front cover). Weekly precipitation totals of 25 - 175 mm kept short-term moisture surpluses intact [5 weeks].

9. Southern Africa:

DRYNESS DEVELOPS.

Drought has developed in Zimbabwe and southern Mozambique, as December's below-normal rainfall pattern continued into January [5 weeks].

10. Northern India, Bangladesh, Central China:

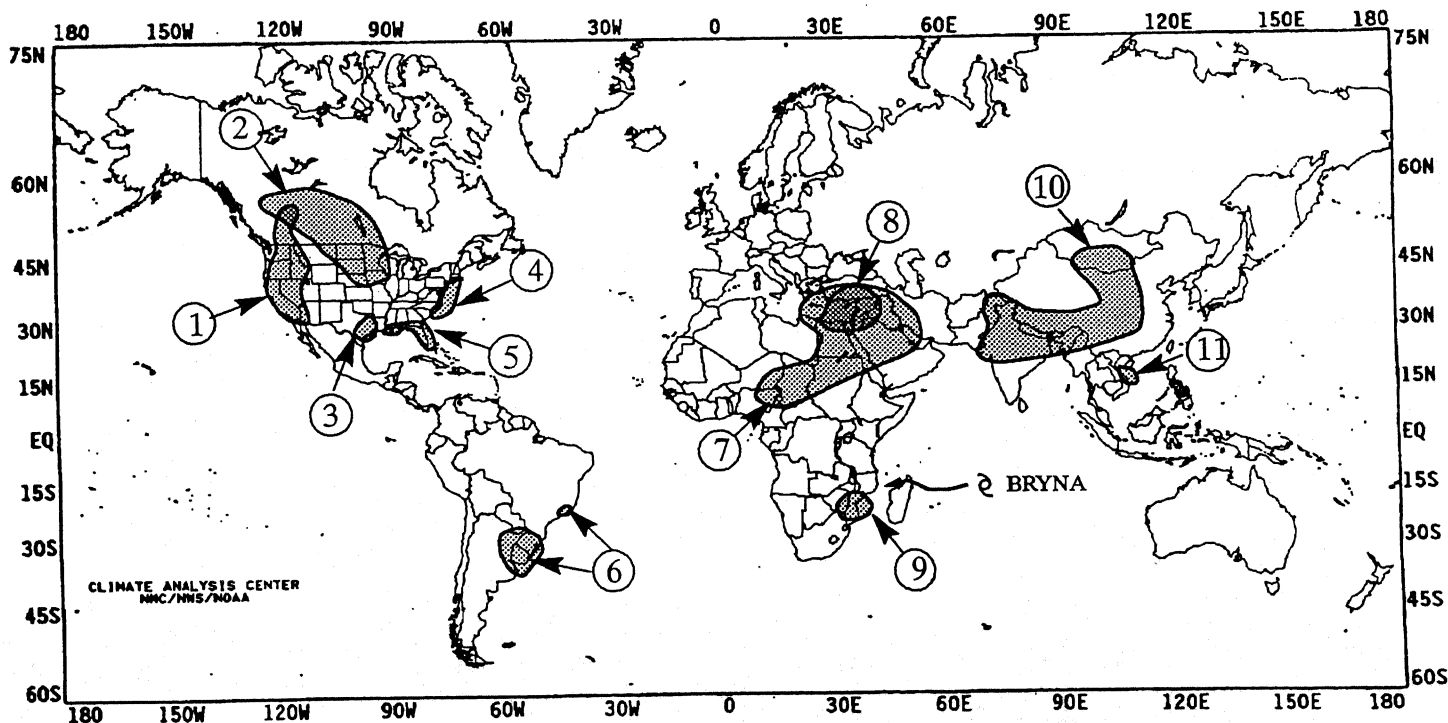
COLD WAVE BLASTS REGION.

Abnormally cold air has settled into a large area from eastern Pakistan eastward to central China and southern Mongolia (see page 6). Twelve deaths have been attributed to the prolonged cold conditions across northern India and low temperatures have dropped to near -30°C in parts of central China [2 weeks].

11. Vietnam:

STORMS LASH COAST.

Stormy weather swept the coast of central Vietnam, killing at least 100 people and causing extensive damage, according to press reports. Unfortunately, reliable precipitation reports are lacking [Episodic Event].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF DECEMBER 29, 1991 THROUGH JANUARY 4, 1992

The transition into the new year was marked by continued downstream flooding in southeastern Texas, welcome heavy rain and snow in California, and a powerful Nor'easter that battered portions of the Atlantic Coast. Up to half a foot of rain, hurricane-force wind gusts, and high surf accompanied a storm system that moved up the Atlantic Seaboard. The storm caused extensive damage to several beach communities, particularly in Delaware. Boardwalks were severely damaged at Bethany Beach and Rehoboth Beach, DE, and to a lesser degree at Ocean City, MD. Coastal flooding was also reported from the Outer Banks in North Carolina to Long Island, NY, with the most serious flooding reported in Maryland and Delaware where evacuations were necessary. Elsewhere, downstream flooding continued to plague southeastern Texas, prompting further evacuations. According to press reports, 24 counties were declared federal disaster areas after more than two weeks of flooding spawned by torrential rains during late December. Farther west, heavy rain soaked parts of California while snow blanketed higher elevations. The rains produced flooding in a few south-central coastal cities and caused a mudslide that closed Highway 1 from Ragged Point to Big Sur, CA on Sunday. Meanwhile, heavy snow blanketed the Sierra Nevadas with a foot recorded at both Mt. Shasta and Mammoth Mountain. In contrast, dry and unusually mild weather prevailed in the northern Plains and upper Midwest. Weekly temperature departures exceeded +20°F at several locations in Minnesota, and highs approached 60°F in western South Dakota.

The week unfolded with yet another storm system lashing the Pacific Coast. More than 3.5 inches of rain soaked the central California coast while heavy snow covered the mountains. The storm also spawned a water spout that moved ashore at Giovata State Park, CA, causing some damage. The system gradually pushed into the Rockies and weakened, dumping more than half a foot of snow from Utah to northwestern Kansas. Farther east, an area of low pressure moved rapidly northeastward across the mid-Atlantic and to the New England coast by Monday. This system dropped light snow and freezing rain across the Great Lakes and western New England, coating roads in northeastern New York and Vermont and creating hazardous driving. To the south, rain fell from the Tennessee Valley to the New England coast.

As 1992 began, the system in the Rockies quickly moved into the nation's mid-section, spreading wintry weather in the central Plains and upper Midwest. Nearly a foot of snow blanketed parts of Nebraska and Kansas while freezing rain and snow fell on parts of Iowa, Minnesota, and Wisconsin. To the south and east, dense fog and rain prevailed from the Mississippi Valley to the Great Lakes. Elsewhere, a low developed off southeastern Florida and crept northward, dumping more than 2 inches of rain on some locations

along the eastern Florida coast. The system in the central U.S. eventually merged with the low off Florida and rapidly intensified, generating gale force winds and high surf along the southern Atlantic Coast. Late in the week, the storm turned west and moved inland across the southern Delmarva Peninsula, dousing coastal locations with heavy rain and producing gusts up to 70 mph. Coastal Maryland and Delaware were hardest hit with numerous roads and homes flooded. Four homes near Ocean City, MD were washed off their foundations and water five feet deep flooded yards and streets. Extensive property damage occurred along coastal Delaware where winds gusted to 83 mph at the Old Coast Guard Station north of Bethany. The storm then looped and progressed to the northeast, downing trees and power lines in New Jersey. In Alaska, blizzard conditions affected the Pribilof Islands Saturday as snow and winds up to 50 mph battered St. Paul Island.

According to the River Forecast Centers, the greatest weekly precipitation totals (more than 2 inches) occurred across the Tennessee and lower Ohio Valleys, most of the mid-Atlantic, scattered locations in eastern New England and Florida, southern Texas, northern and central California, the Pacific Northwest, and southeastern Alaska. Light to moderate amounts were measured in eastern Hawaii, the remainder of Alaska, along the Pacific Coast states, in the Southwest, south-central Rockies, southern two-thirds of the Plains, and throughout most of the country east of the Mississippi River. Little or no precipitation reported in the eastern Great Basin, New Mexico, northern thirds of the Rockies and Plains, upper Midwest, and along the central and eastern Gulf Coast region.

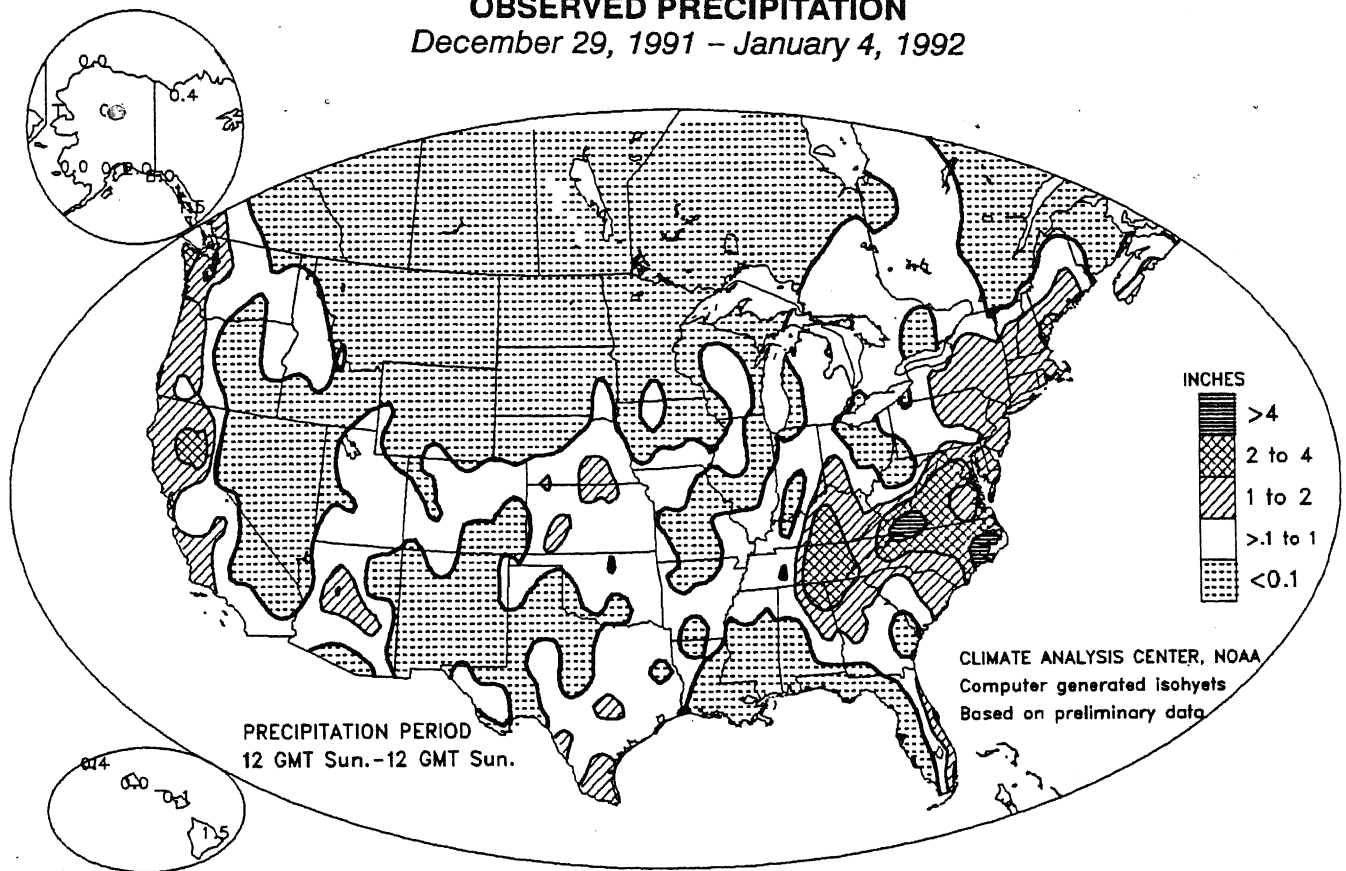
Atypically mild weather prevailed throughout most of the north-central states for the fourth straight week. Weekly departures up to +26°F were recorded in Minnesota while departures exceeding +15°F were common across the northern Rockies, Plains, and upper Midwest. Although the departures were quite large, the warmth was not of record proportions as only a few daily record highs were observed. However, there was also a distinctive lack of sub-zero readings across the region, quite unusual for early January. Elsewhere, above normal temperatures occurred across the Pacific Northwest, Great Basin, northern Rockies, and much of the eastern two-thirds of the country. In Alaska, abnormal warmth dominated the eastern two-thirds of the state with weekly departures up to +16°F recorded in the southeast.

In the lower 48 states, colder than normal conditions were limited to the central and southern Rockies, parts of the desert Southwest, and along the Gulf Coast region. Weekly departures of -4°F to -8°F were recorded at a few locations in the central Rockies and northern Florida while the remaining areas reported slightly below normal temperatures. In Alaska, negative weekly departures (-8°F at Bethel) were confined to western Alaska.

TABLE 1. SELECTED STATIONS WITH 2.00 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF DECEMBER 29, 1991 – JANUARY 4, 1992

| STATION | TOTAL | STATION | TOTAL |
|---------------------------------|-------|-----------------------------------|-------|
| YAKUTAT, AK | 8.02 | GREENSBORO, NC | 2.51 |
| CHERRY POINT MCAS, NC | 5.94 | WASHINGTON/NATIONAL, DC | 2.49 |
| NEW BERN, NC | 4.89 | GOLDSBORO/SEYMOUR-JOHNSON AFB, NC | 2.40 |
| NORFOLK, VA | 3.87 | NEWPORT NEWS/HENRY NDB, VA | 2.31 |
| NORFOLK/CHAMBERS NDB, VA | 3.86 | SANTA BARBARA, CA | 2.31 |
| QUILLAYUTE, WA | 3.73 | CHATTANOOGA, TN | 2.26 |
| JACKSONVILLE/NEW RIVER MCAS, NC | 3.62 | PASO ROBLES, CA | 2.18 |
| CAPE HATTERAS, NC | 3.27 | PORTLAND, ME | 2.06 |
| ANNETTE ISLAND, AK | 3.11 | HAMPTON/LANGLEY AFB, VA | 2.01 |
| RALEIGH-DURHAM, NC | 2.89 | CORDOVA/MILE 13, AK | 2.00 |
| REDDING, CA | 2.79 | | |

OBSERVED PRECIPITATION December 29, 1991 – January 4, 1992



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F) December 29, 1991 – January 4, 1992

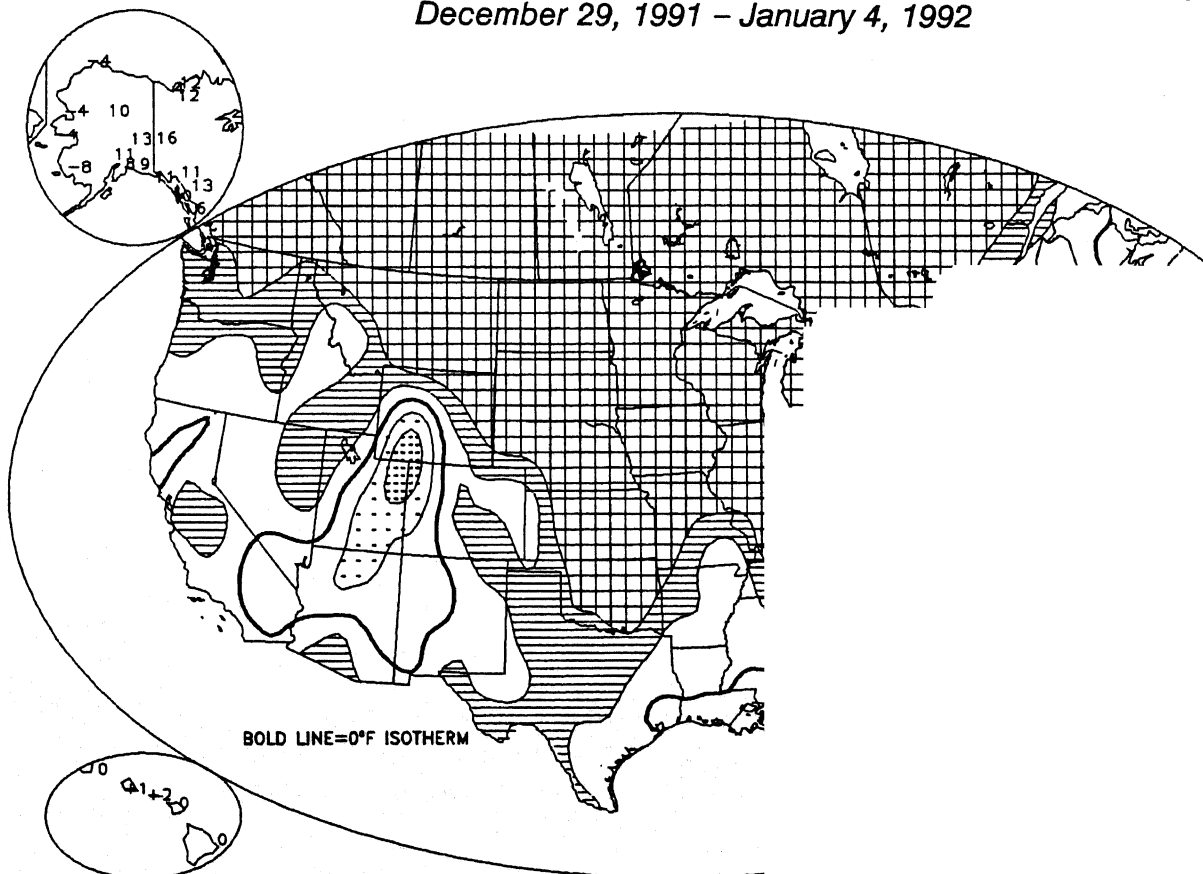


TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 16.0°F OR MORE ABOVE NORMAL FOR THE WEEK OF DECEMBER 29, 1991 – JANUARY 4, 1992

| STATION | DEPARTURE (°F) | AVERAGE (°F) | STATION | DEPARTURE (°F) | AVERAGE (°F) |
|-------------------------|-------------------|-----------------|-------------------|-------------------|-----------------|
| INTERNATIONAL FALLS, MN | +25.8 | 27.8 | DEVIL'S LAKE, ND | +19.1 | 24.6 |
| GRAND FORKS, ND | +25.6 | 29.9 | BISMARCK, ND | +19.0 | 28.0 |
| FARGO, ND | +24.9 | 31.4 | ROCHESTER, MN | +18.1 | 29.7 |
| WARROAD, MN | +24.0 | 27.9 | SIOUX FALLS, SD | +18.0 | 32.3 |
| ALEXANDRIA, MN | +23.1 | 30.8 | MT WASHINGTON, NH | +17.3 | 23.6 |
| ABERDEEN, SD | +21.5 | 31.5 | PARK FALLS, WI | +16.9 | 27.8 |
| ST CLOUD, MN | +21.3 | 30.7 | MASON CITY, IA | +16.8 | 30.9 |
| JAMESTOWN, ND | +21.3 | 28.7 | DICKINSON, ND | +16.8 | 29.8 |
| HURON, SD | +21.1 | 34.3 | WAUSAU, WI | +16.7 | 29.6 |
| WATERTOWN, SD | +20.6 | 30.6 | LA CROSSE, WI | +16.5 | 32.6 |
| MINOT, ND | +20.4 | 28.8 | FT YUKON, AK | +16.4 | -4.6 |
| DULUTH, MN | +19.8 | 28.2 | GULKANA, AK | +16.4 | 6.9 |
| MINNEAPOLIS, MN | +19.2 | 32.3 | SPENCER, IA | +16.3 | 30.6 |
| EAU CLAIRE, WI | +19.2 | 31.0 | WILLISTON, ND | +16.2 | 25.4 |

TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 2.0°F OR MORE BELOW NORMAL FOR THE WEEK OF DECEMBER 29, 1991 – JANUARY 4, 1992

| STATION | DEPARTURE (°F) | AVERAGE (°F) | STATION | DEPARTURE (°F) | AVERAGE (°F) |
|----------------------------|-------------------|-----------------|-------------------------|-------------------|-----------------|
| BETHEL, AK | -8.1 | -4.1 | GRAND JUNCTION, CO | -3.9 | 21.5 |
| ROCK SPRINGS/SWEETWATER WY | -7.4 | 12.6 | GAINESVILLE, FL | -3.8 | 53.4 |
| ST PAUL ISLAND, AK | -6.3 | 21.4 | NEW ORLEANS/MOISANT, LA | -3.4 | 49.6 |
| LANDER, WY | -5.6 | 14.4 | PRESCOTT, AZ | -3.3 | 34.3 |
| PRICE, UT | -4.8 | 18.3 | DAGGETT, CA | -3.1 | 44.4 |
| KOTZEBUE, AK | -4.6 | -8.6 | WINSLOW, AZ | -2.6 | 28.5 |
| NOME, AK | -4.3 | 0.3 | FLAGSTAFF, AZ | -2.2 | 26.1 |
| BARROW, AK | -4.0 | -17.9 | LAFAYETTE, LA | -2.2 | 50.0 |

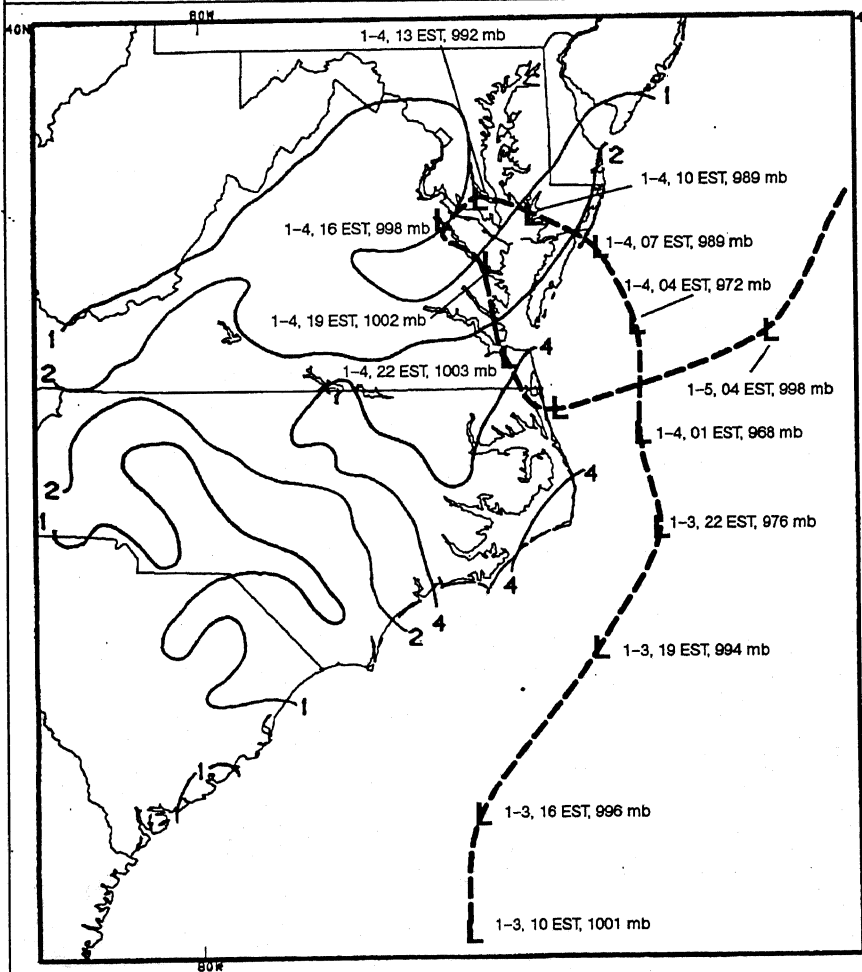
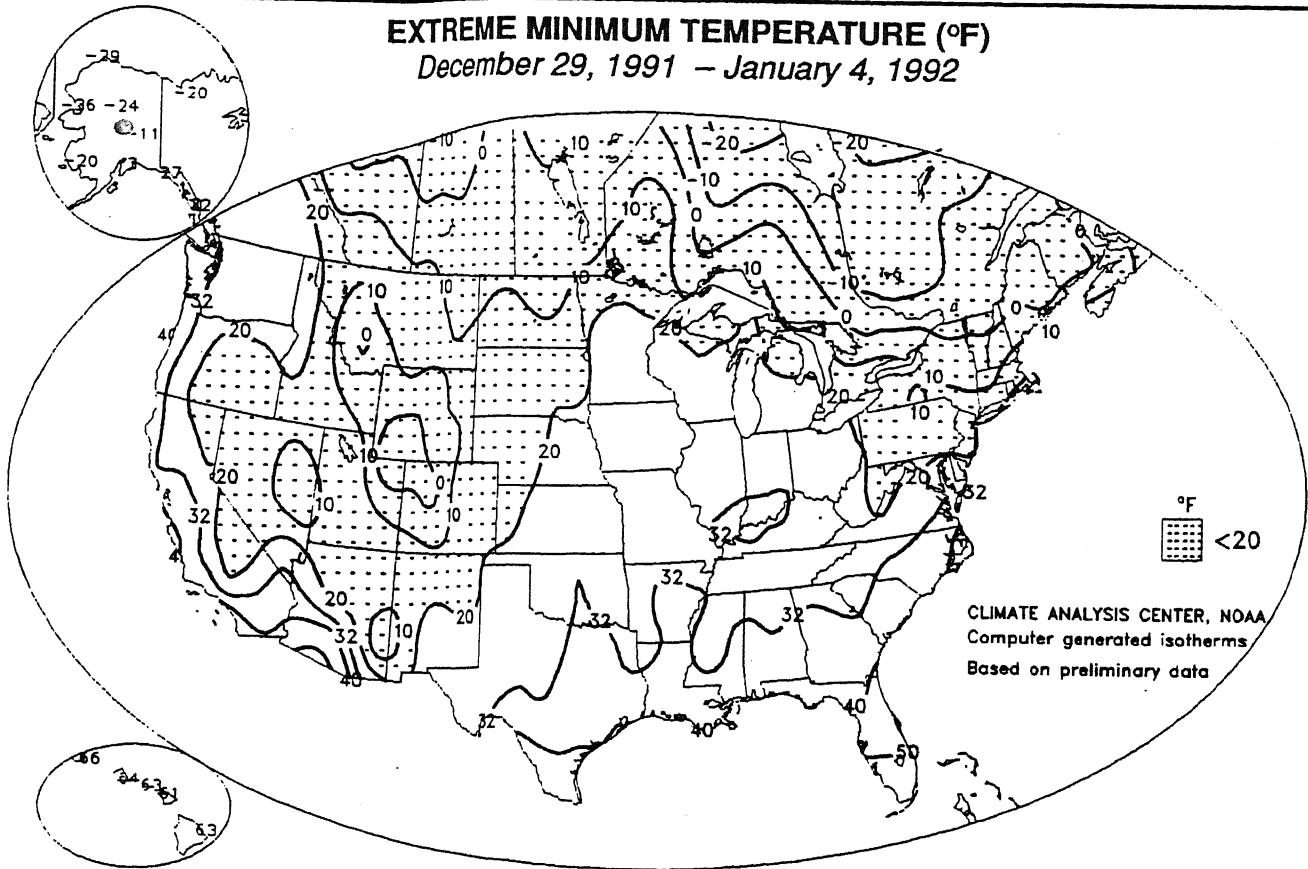


FIGURE 1. Total Precipitation (inches) and Track of Recent "Nor'easter" (with a chronology of position and minimum central pressure), January 2 – 5, 1992. As the week drew to a close, a powerful low-pressure center developed explosively off the southern mid-Atlantic coast and plowed onshore near the Maryland/Virginia border early Saturday. The system then continued westward, moving across southern Maryland, before diving southward and eventually re-curve northeastward and out to sea later Sunday. The storm spread moderate to heavy rains (generally 2 to 6 inches) across parts of the Carolinas' and mid-Atlantic coast, with the highest totals measured in eastern North Carolina. However, the worst coastal damage was observed from Virginia northward through New Jersey, according to press reports, as powerful onshore winds gusted to hurricane force. The ground level of numerous buildings were flooded by several inches of water, and a number of homes were washed off their foundations, with several swept out to sea. Portions of the boardwalks in Rehobeth, Dewey Beach, and Bethany, DE, were destroyed, and an 8-mile-long sand dune constructed to protect beachfront high-rise hotels and condominiums in Ocean City, MD was completely washed away. Fortunately, no deaths and only one serious injury were attributed to the storm, although at least 11 wild ponies and 20 deer were killed on Assateague Island.

EXTREME MINIMUM TEMPERATURE (°F)

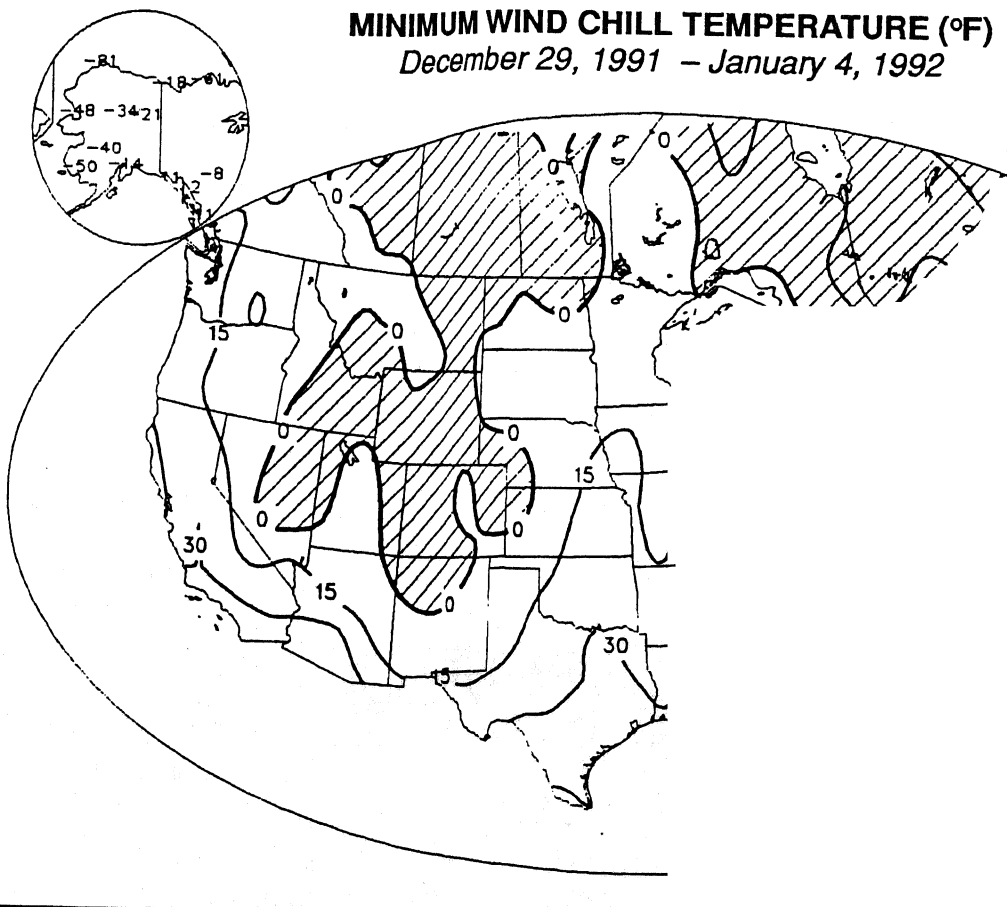
December 29, 1991 – January 4, 1992



A lack of Arctic air nationwide kept low temperatures above 0°F (top) and wind chills above -15°F (bottom) in most of the country. Much of the deep South, south Atlantic coast, and Far West remained above freezing throughout the week.

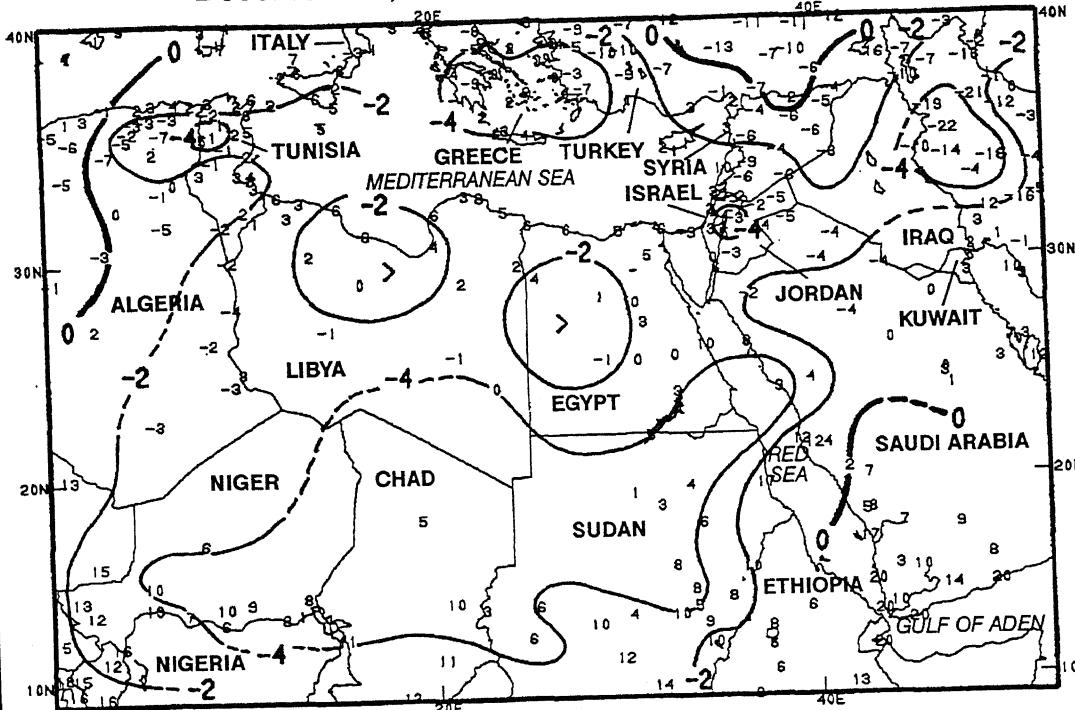
MINIMUM WIND CHILL TEMPERATURE (°F)

December 29, 1991 – January 4, 1992

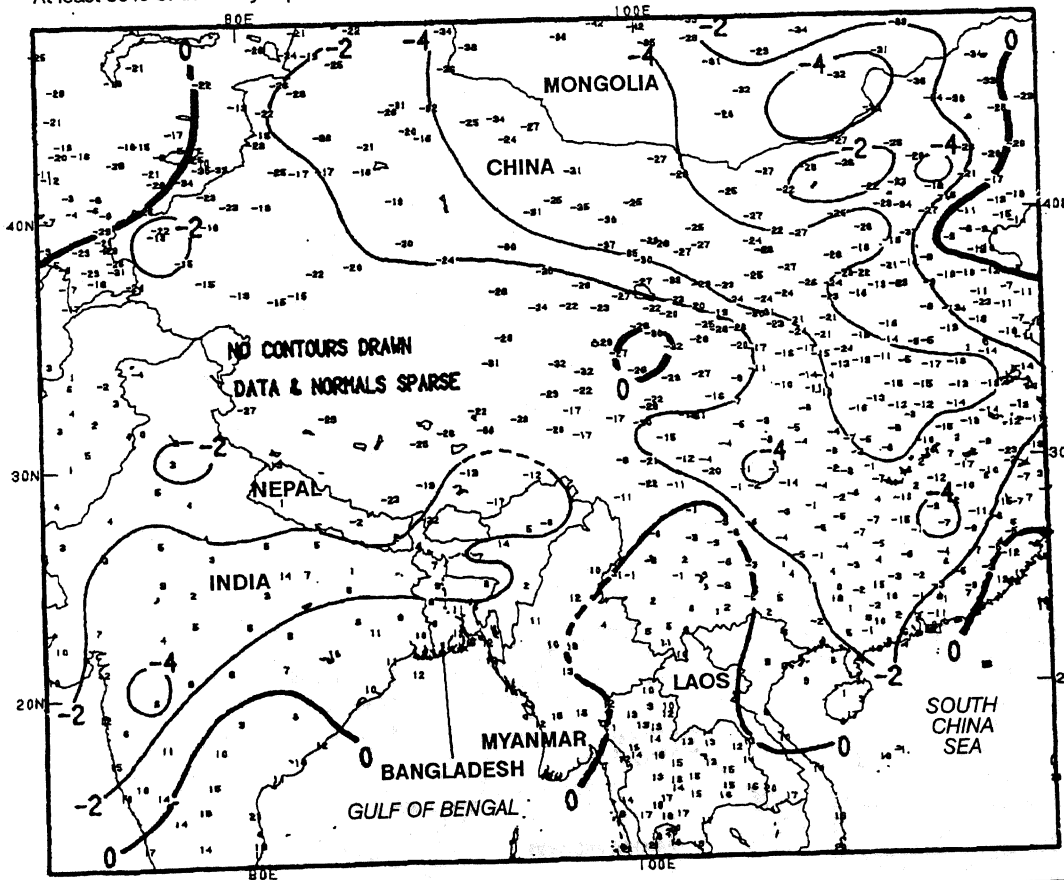


GLOBAL CLIMATE HIGHLIGHTS FEATURE

PIOTTED VALUES: Extreme Minimum Temperatures (°C)
CONTOURS: Departure from Normal Average Temperature (°C)
December 22, 1991 – January 4, 1992 (14 days)



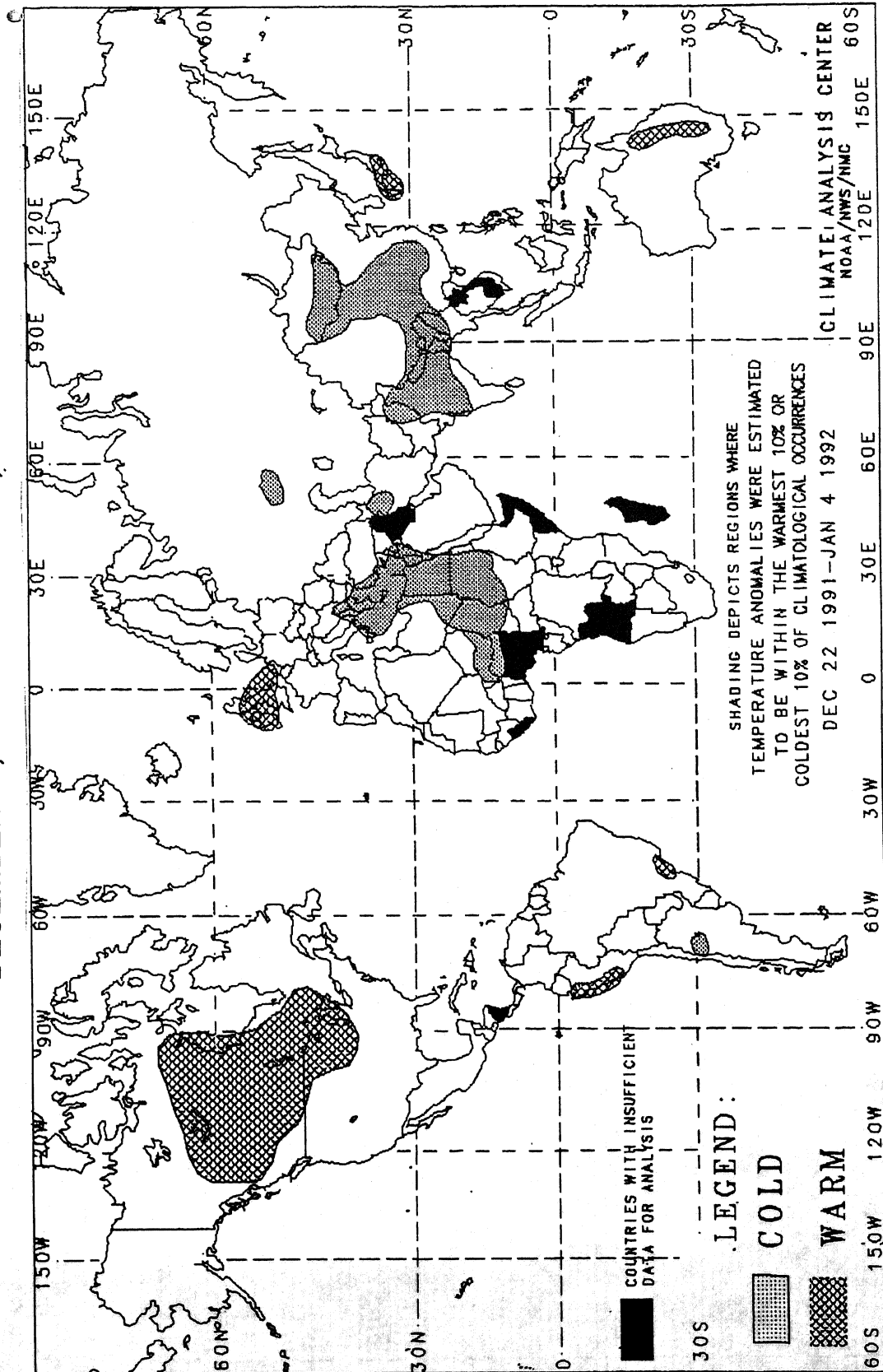
At least 50% of the daily reports were required for inclusion. Isopleths drawn only for 0°C, -2°C, and -4°C.



Abnormally cold air has settled over large sections of northern Africa, the Middle East, south-central Asia, and the Far East during the last two weeks. Many locations have recorded departures of -4°C to -6°C during this period while atypically mild air spread across some areas farther to the north, such as northern Europe and Siberia. Subfreezing readings have been observed as far south as the southern sections of Algeria, Libya, and Egypt while the mercury has dropped as low as -22°C to -31°C in portions of northwestern Iran, the Pamir Mountains, and north-central China. In Khartoum, Sudan, residents more accustomed to hot weather were forced to remain indoors when readings plunged to 8°C. In addition, the unusually chilly conditions have been blamed for 14 deaths across northern India, according to press reports.

2-WEEK GLOBAL TEMPERATURE ANOMALIES

DECEMBER 22, 1991 – JANUARY 4, 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

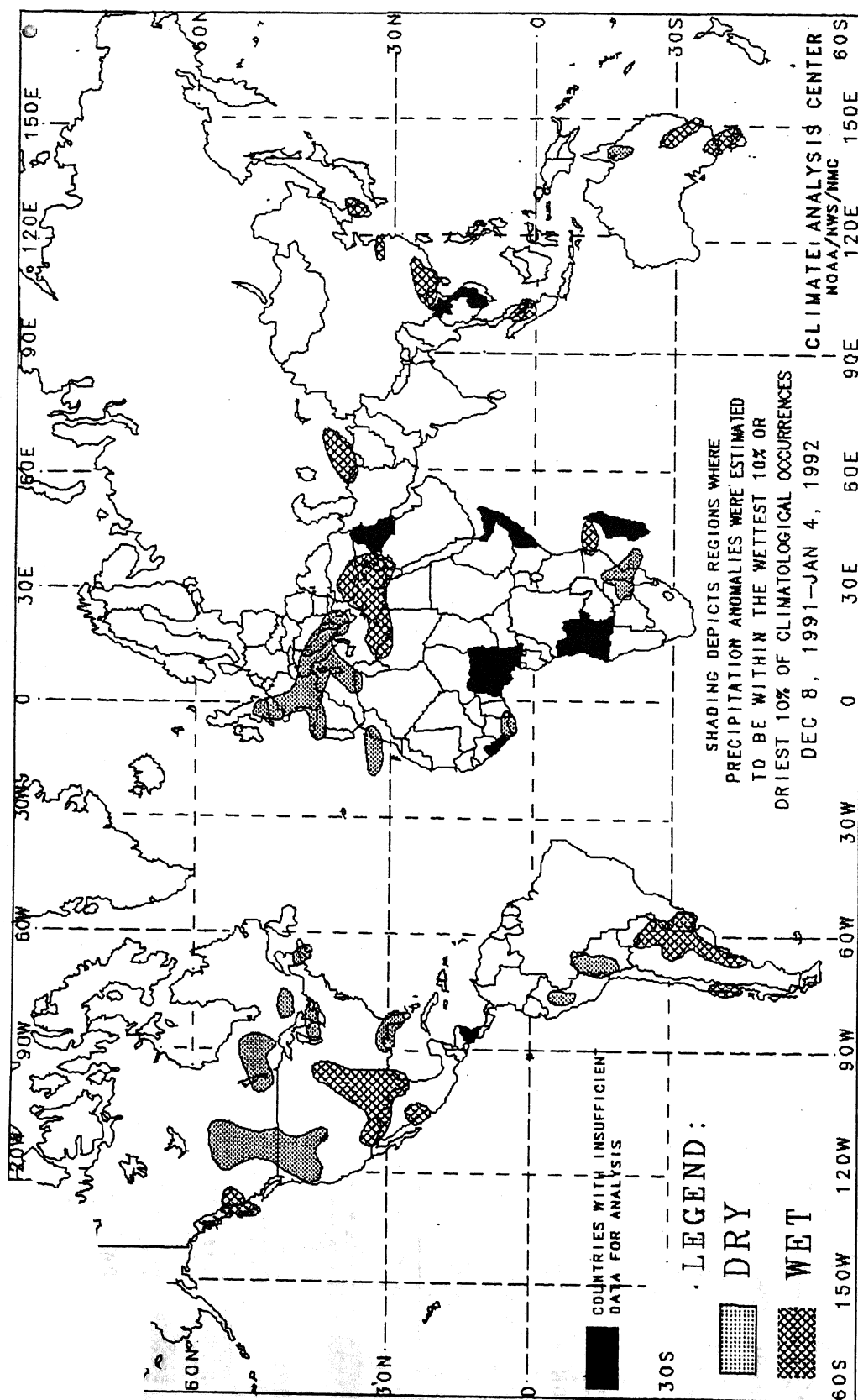
Temperature anomalies are not depicted unless the magnitude of

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4-WEEK GLOBAL PRECIPITATION ANOMALIES

DECEMBER 8, 1991 – JANUARY 4, 1992



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, intertropical South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

UNITED STATES MONTHLY CLIMATE SUMMARY

December 1991

Slow-moving storm systems brought torrential December rains to central and southeastern Texas and from northern Mississippi to the southern Appalachians. Heavy rains during the first week of the month sent rivers and streams out of their banks in the Tennessee and lower Ohio Valleys, flooding roads and lowlands and causing several deaths. Later in December, several days of heavy rain produced severe flooding in Texas, taking at least 15 lives, inundating numerous homes, drowning livestock, and causing an estimated \$75 million in damages, according to press reports. Flooding was close to or above record levels along the Guadalupe, Brazos, Trinity, and Colorado Rivers. Meanwhile, a series of Pacific storms brought much of California the first significant precipitation of the 1991–1992 rainy season. Although the storms brought surplus December precipitation to southern California, the remainder of the state and the Pacific Northwest received subnormal monthly totals. Abnormally dry weather also affected the southern Atlantic Coast states, particularly Florida. Winter storms brought blizzard conditions to the north-central states early in the month, but a notable lack of Arctic outbreaks allowed December temperatures to average as much as 8°F above normal in the northern Plains. In northeastern Kauai Island, Hawaii, localized thundershowers dumped up to 15 inches of rain within 24 hours (December 14), producing flash flooding along the Anahola River which killed 3 people and caused an estimated \$7.1 million in damages.

A stalled frontal system at the beginning of the month dumped heavy rain on a broad area from the southeastern Great Plains and lower Mississippi Valley to southern New England and the mid-Atlantic coast. Unseasonably warm weather prevailed ahead of the system while record-breaking cold behind the storm gripped the Midwest where temperatures dropped below zero. Snow fell from the northern Plains to the Northeast, with portions of the Great Lakes snowbelt receiving nearly two feet of snow. Farther west, a storm system spread heavy precipitation across the Pacific Northwest. During the second week of December, unseasonably mild weather dominated much of the country as nearly 50 daily record highs were set from Texas to Connecticut. Strong thunderstorms rocked portions of the Midwest, Mississippi Valley, and western Gulf Coast, spawning heavy rain, hail, and tornadoes. Heavy snow blanketed parts of the Rockies, while a mid-month storm generated blizzard conditions across North Dakota, Minnesota, Wisconsin, and Michigan.

During the latter part of the month, torrential rains pounded central and eastern Texas, sending rivers and streams out of their banks and inundating farmland and homes. As much as 16.2 inches of rain fell during a 5-day deluge from December 18–22, and additional moderate rains aggravated flooding through the end of the month. A frontal system spread rain across the Southeast and Tennessee Valley and spread mixed precipitation from the

Midwest to southern New England. A pair of strong Pacific storms during December 27–30 brought California badly needed precipitation. The storms doused most coastal sections of the state with over 2 inches of rain and buried the higher elevations with up to four feet of snow. Elsewhere, unusually mild conditions in the northern Rockies and Plains spread into the nation's midsection by month's end.

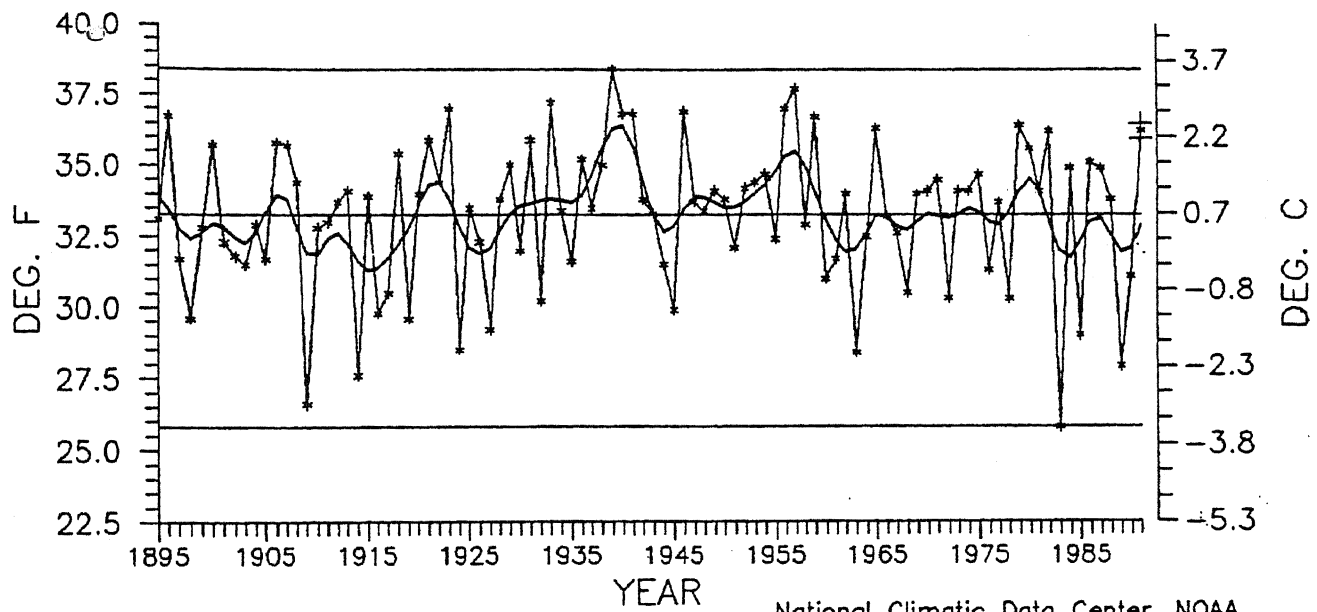
According to the River Forecast Centers, the greatest monthly precipitation (more than 8 inches) was measured along the western Gulf Coast, in the southern Great Plains, Tennessee Valley, southern Appalachians, and portions of the lower Mississippi Valley, central Appalachians, northern Cascades, southern Alaska, and Hawaii (Table 1). Above normal December precipitation covered southern California, the Southwest, southern Rockies, southern two-thirds of the Plains, most of the Mississippi Valley, Tennessee, and lower Ohio Valleys, Appalachians, mid-Atlantic, western and eastern Hawaiian islands, and southern Alaska (Figure 2). On a state-wide basis, December 1991 was the wettest December ever in Texas (page 16). Regionally, December was significantly wet in the South and Southwest, ranking as the 10th and 15th wettest December on record, respectively (page 11).

In contrast, less than 75% of normal December precipitation was observed across much of the Pacific Northwest, northern California, Great Basin, northern and central Rockies, northern Plains, along the eastern Gulf and southern Atlantic Coasts, in central Hawaiian islands, northern Alaska, and parts of the central Corn Belt, Great Lakes, and northern New England (Figure 1, page 13). In addition, some locations in the upper Missouri Valley and north-central High Plains recorded no measurable December precipitation. Regionally, the Northwest had the 10th driest December on record while the West-North Central observed the 11th driest December.

With relatively few incursions of Arctic air, most of the nation experienced above normal December temperatures (Figure 4, page 14). Unseasonably mild weather prevailed across the northern third of the Rockies and northern half of the Plains where temperatures averaged more than 6°F above normal. Nationally, December 1991 ranked as the 14th warmest December on record. The West-North Central region was particularly mild as December 1991 ranked as the 9th warmest December. Three states in the region [MT, NE, SD] recorded one of the ten warmest Decembers since 1895, along with KS and OK (page 11).

The lack of Arctic outbreaks limited subnormal monthly temperatures to northern Maine, northwestern Alaska, and valley stations in the central Rockies (page 15). Not surprisingly, none of the nine regions were in the lower (cold) half of the historical distribution (page 11), and the lowest ranked state for December 1991 was Maine at 33.

U.S. NATIONAL TEMPERATURE DECEMBER, 1895-1991

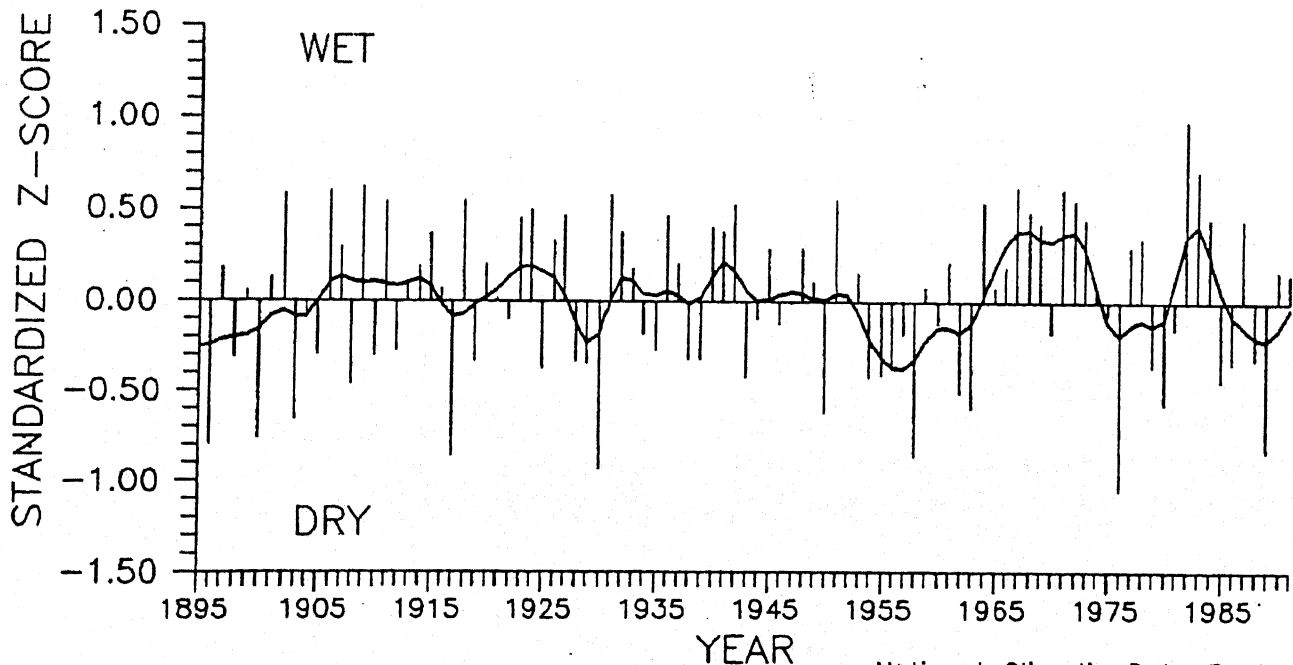


STRAIGHT HORIZONTAL LINES ARE:
MAXIMUM VALUE (TOP),
LONG-TERM AVERAGE (MIDDLE),
MINIMUM VALUE (BOTTOM)

CONFIDENCE INTERVAL
FOR CURRENT YEAR IS
INDICATED BY '+'

Nationally Averaged December Temperatures 1895 - 1991, as Computed by the National Climatic Data Center. December 1991, for the nation as a whole, averaged considerably above the long-term mean (14th warmest). The 1991 value is based on preliminary data, which has been shown to be within 0.26°F of the final data over a 31-month period.

U.S. NATIONAL WEIGHTED MEAN PRECIPITATION INDEX DECEMBER, 1895-1991



National Mean December Precipitation Index, 1895-1991, as Computed by the National Climatic Data Center. December 1991 ranked as 43rd wettest December on record. This index takes local normals into account so that typically wet regions do not dominate the index value.

**TEMPERATURE AND PRECIPITATION RANKINGS FOR
DECEMBER 1991, BASED ON THE PERIOD 1895 TO 1991.
1 = DRIEST/COLDEST AND 97 = WETTEST/HOTTEST.**

| REGION | PRECIPITATION | TEMPERATURE |
|--------------------|---------------|-------------|
| NORTHEAST | 51 | 59 |
| EAST NORTH CENTRAL | 60 | 73 |
| CENTRAL | 77 | 81 |
| SOUTHEAST | 34 | 78 |
| WEST NORTH CENTRAL | 11 | 89 |
| SOUTH | 95 | 83 |
| SOUTHWEST | 83 | 51 |
| NORTHWEST | 10 | 81 |
| WEST | 32 | 54 |
| NATIONAL | 73 | 12 |

National Climatic Data Center

Top Ten Rankings: *ITALICS* Bottom Ten Rankings: **BOLD**

**TEMPERATURE RANKINGS FOR DECEMBER 1991, BASED ON THE
PERIOD 1895 TO 1991. 1 = COLDEST AND 97 = WARMEST.**

| <u>STATE</u> | <u>RANK</u> | <u>STATE</u> | <u>RANK</u> | <u>STATE</u> | <u>RANK</u> | <u>STATE</u> | <u>RANK</u> |
|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|
| AL | 72 | IA | 82 | NE | 91 | RI | 85 |
| AZ | 64 | KS | 89 | NV | 54 | SC | 80 |
| AR | 78 | KY | 86 | NH | 58 | SD | 89 |
| CA | 53 | LA | 80 | NJ | 78 | TN | 74 |
| CO | 45 | ME | 33 | NM | 47 | TX | 77 |
| CT | 76 | MD | 78 | NY | 62 | UT | |
| DE | 80 | MA | 62 | NC | 84 | | |
| FL | 70 | MI | 63 | | | | |
| GA | 76 | MN | 74 | | | | |
| ID | 75 | MS | 85 | | | | |
| IL | 77 | MO | 77 | | | | |
| IN | 75 | MT | 92 | | | | |

TABLE 1. SELECTED STATIONS WITH 150% OR MORE OF THE NORMAL PRECIPITATION AND 8.00 INCHES OR MORE PRECIPITATION; OR, STATIONS WITH 10.00 INCHES OR MORE PRECIPITATION AND NO NORMALS DURING DECEMBER 1991.

| <u>STATION</u> | <u>TOTAL</u> <u>(INCHES)</u> | <u>PCT. OF</u> <u>NORMAL</u> | <u>STATION</u> | <u>TOTAL</u> <u>(INCHES)</u> | <u>PCT. OF</u> <u>NORMAL</u> |
|---------------------------|---------------------------------|---------------------------------|-----------------------|---------------------------------|---------------------------------|
| ANNETTE ISLAND, AK | 23.16 | 179.7 | KNOXVILLE, TN | 10.23 | 223.9 |
| YAKUTAT, AK | 19.73 | 152.0 | CORPUS CHRISTI, TX | 9.80 | 809.9 |
| AUSTIN, TX | 14.16 | 694.1 | JACKSON, KY | 9.35 | 264.9 |
| SAN ANTONIO, TX | 13.96 | 1000.0 | HOUSTON, TX | 9.34 | 247.7 |
| SAN ANTONIO/RANDOLPH, TX | 13.61 | *** | VALDEZ, AK | 9.19 | 176.4 |
| SAN ANTONIO/KELLY AFB, TX | 12.33 | *** | DALLAS/LOVE FIELD, TX | 9.19 | 423.5 |
| AUSTIN/BERGSTROM AFB, TX | 12.22 | 529.0 | KINGSVILLE NAS, TX | 9.04 | 579.5 |
| HUNTSVILLE, AL | 11.84 | 218.0 | JUNEAU, AK | 9.03 | 194.6 |
| CROSSVILLE, TN | 11.83 | 223.2 | DALLAS-FT WORTH, TX | 8.75 | 511.7 |
| MUSCLE SHOALS, AL | 11.69 | 220.6 | WACO, TX | 8.44 | 446.6 |
| PORT ARTHUR, TX | 11.53 | 235.8 | GREENWOOD, MS | 8.37 | 155.0 |
| TUPELO, MS | 10.92 | *** | CHATTANOOGA, TN | 8.02 | 155.7 |
| FT WORTH/CARSWELL AFB, TX | 10.48 | *** | | | |

NOTE: Stations without precipitation normals are indicated by asterisks.

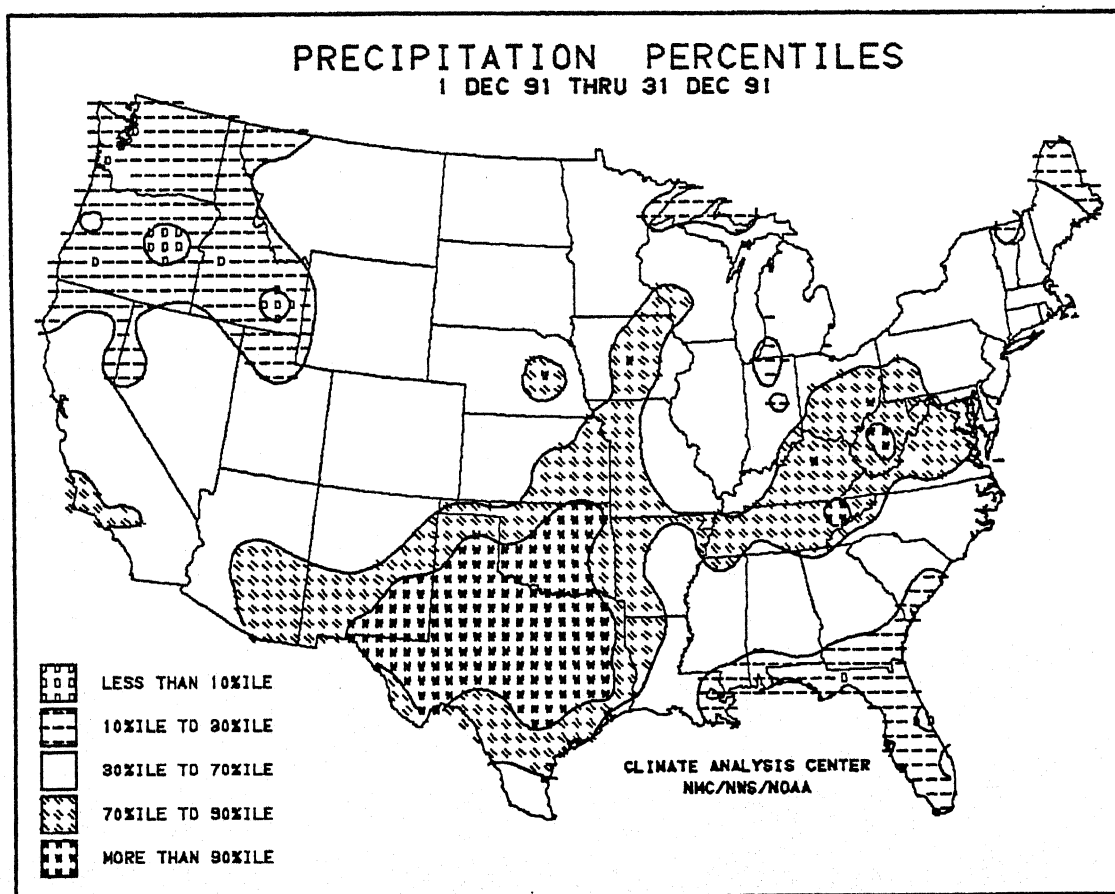


FIGURE 1. December 1991 Precipitation Percentiles. Significant December dryness [$<30\%$ ile] was observed in the Pacific Northwest, along the eastern Gulf and south Atlantic Coasts, in northern New England, and across portions of the upper Great Lakes. In contrast, abnormally wet weather [$>70\%$ ile] afflicted the southern Plains, the Tennessee and Ohio Valleys, and portions of the Southwest, central Plains, Mississippi Valley, and mid-Atlantic. Much of the southern Plains was extremely wet, ranking in the top 10% of the historical distribution.

TABLE 2. SELECTED STATIONS WITH 60% OR LESS OF THE NORMAL PRECIPITATION AND NORMAL PRECIPITATION OF 3.00 INCHES OR MORE DURING DECEMBER 1991.

| STATION | TOTAL (INCHES) | PCT. OF NORMAL | NORMAL (INCHES) | STATION | TOTAL (INCHES) | PCT. OF NORMAL | NORMAL (INCHES) |
|--------------------------|-------------------|-------------------|--------------------|-------------------------|-------------------|-------------------|--------------------|
| GAINESVILLE, FL | 0.81 | 27.0 | 3.00 | LAKE CHARLES, LA | 2.16 | 42.7 | 5.06 |
| MEDFORD, OR | 1.08 | 31.1 | 3.47 | BATON ROUGE, LA | 2.36 | 47.3 | 4.99 |
| HONOLULU, OAHU, HI | 1.22 | 35.8 | 3.41 | EUREKA, CA | 2.37 | 38.2 | 6.20 |
| SUMTER/SHAW AFB, SC | 1.46 | 44.8 | 3.26 | EASTPORT, ME | 2.40 | 51.2 | 4.69 |
| APALACHICOLA, FL | 1.50 | 42.9 | 3.50 | LAFAYETTE, LA | 2.52 | 50.2 | 5.02 |
| VALPARAISO/EGLIN AFB, FL | 1.54 | 36.7 | 4.20 | BOSTON/LOGAN, MA | 2.58 | 57.8 | 4.46 |
| WAYCROSS, GA | 1.59 | 49.8 | 3.19 | NEW ORLEANS/MOISANT, LA | 2.63 | 50.2 | 5.24 |
| TALLAHASSEE, FL | 1.59 | 34.9 | 4.56 | BELLINGHAM, WA | 2.72 | 52.9 | 5.14 |
| CHARLESTON, SC | 1.62 | 52.4 | 3.09 | MOBILE, AL | 3.09 | 57.1 | 5.41 |
| PENSACOLA, FL | 1.64 | 40.1 | 4.09 | SEATTLE-TACOMA, WA | 3.30 | 52.3 | 6.31 |
| SEXTON SUMMIT, OR | 1.69 | 26.3 | 6.42 | SALEM, OR | 3.73 | 52.7 | 7.08 |
| BANGOR, ME | 1.83 | 44.0 | 4.16 | OLYMPIA, WA | 4.29 | 49.3 | 8.70 |
| RUMFORD, ME | 1.87 | 48.2 | 3.88 | NORTH BEND, OR | 5.56 | 51.4 | 10.81 |
| ALBANY, GA | 1.95 | 59.8 | 3.26 | ASTORIA, OR | 6.60 | 56.9 | 11.59 |

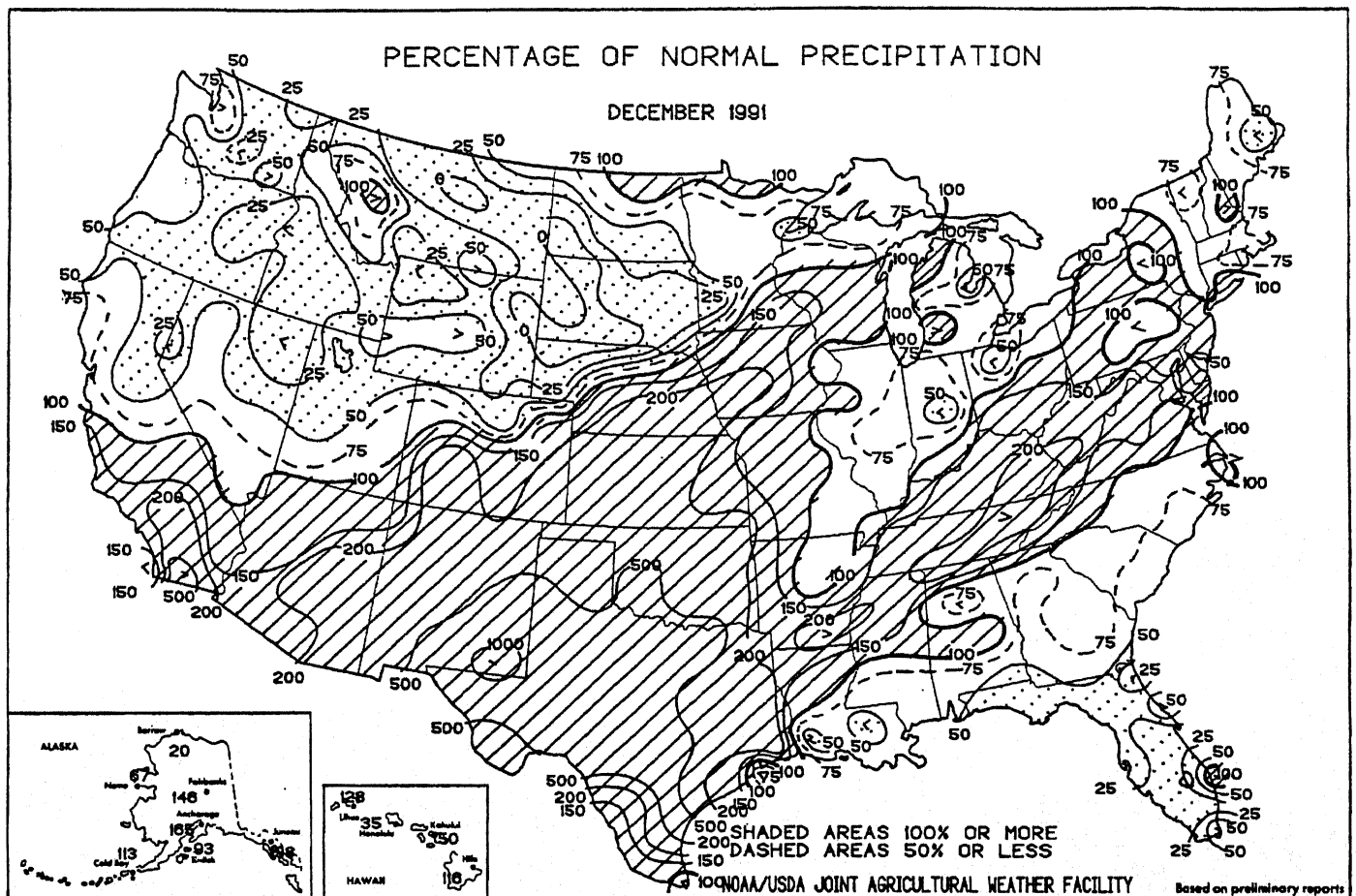


FIGURE 2. December 1991 Percent of Normal Precipitation. *Isopleths drawn for 0, 25, 50, 75, 100, 150, 500, and 1000 percent. Precipitation was abnormally heavy across much of the Southwest, southern Rockies, central and southern Plains, western Gulf Coast, and portions of the Tennessee, southern Ohio and lower Mississippi Valleys, where more than twice the normal totals were measured. Five to ten times the normal amounts inundated parts of the south-central and southwestern Plains. In sharp contrast, much of the Pacific Northwest, the Sierra Nevadas, the Great Basin, the northern and central Rockies, the northern Plains, and Florida received less than half of normal precipitation.*

TABLE 3. DECEMBER 1991 AVERAGE TEMPERATURE 7.0°F OR MORE ABOVE NORMAL.

| STATION | DEPARTURE (°F) | AVERAGE (°F) | STATION | DEPARTURE (°F) | AVERAGE (°F) |
|----------------|-------------------|-----------------|------------------|-------------------|-----------------|
| HEAT FALLS, MT | +9.7 | 30.8 | ABERDEEN, SD | +7.7 | 24.1 |
| HEAT FALLS, MT | +9.5 | 25.2 | WILLISTON, ND | +7.7 | 23.4 |
| HEAT FALLS, MT | +9.4 | 30.9 | JAMESTOWN, ND | +7.6 | 21.2 |
| HEAT FALLS, MT | +9.1 | 27.7 | MINOT, ND | +7.5 | 22.2 |
| HEAT FALLS, MT | +9.1 | 3.3 | NORTH PLATTE, NE | +7.4 | 33.4 |
| HEAT FALLS, MT | +8.8 | 35.1 | BIG DELTA, AK | +7.4 | 3.0 |
| HEAT FALLS, MT | +8.8 | 20.8 | FAIRBANKS, AK | +7.2 | -2.7 |
| HEAT FALLS, MT | +8.4 | 27.6 | YAKUTAT, AK | +7.1 | 34.1 |
| HEAT FALLS, MT | +8.3 | 27.9 | PICKSTOWN, SD | +7.1 | 31.7 |
| HEAT FALLS, MT | +8.1 | 25.0 | SITKA, AK | +7.0 | 39.6 |
| HEAT FALLS, MT | +7.9 | 29.8 | LINCOLN, NE | +7.0 | 33.6 |
| HEAT FALLS, MT | +7.8 | 32.1 | HURON, SD | +7.0 | 26.2 |

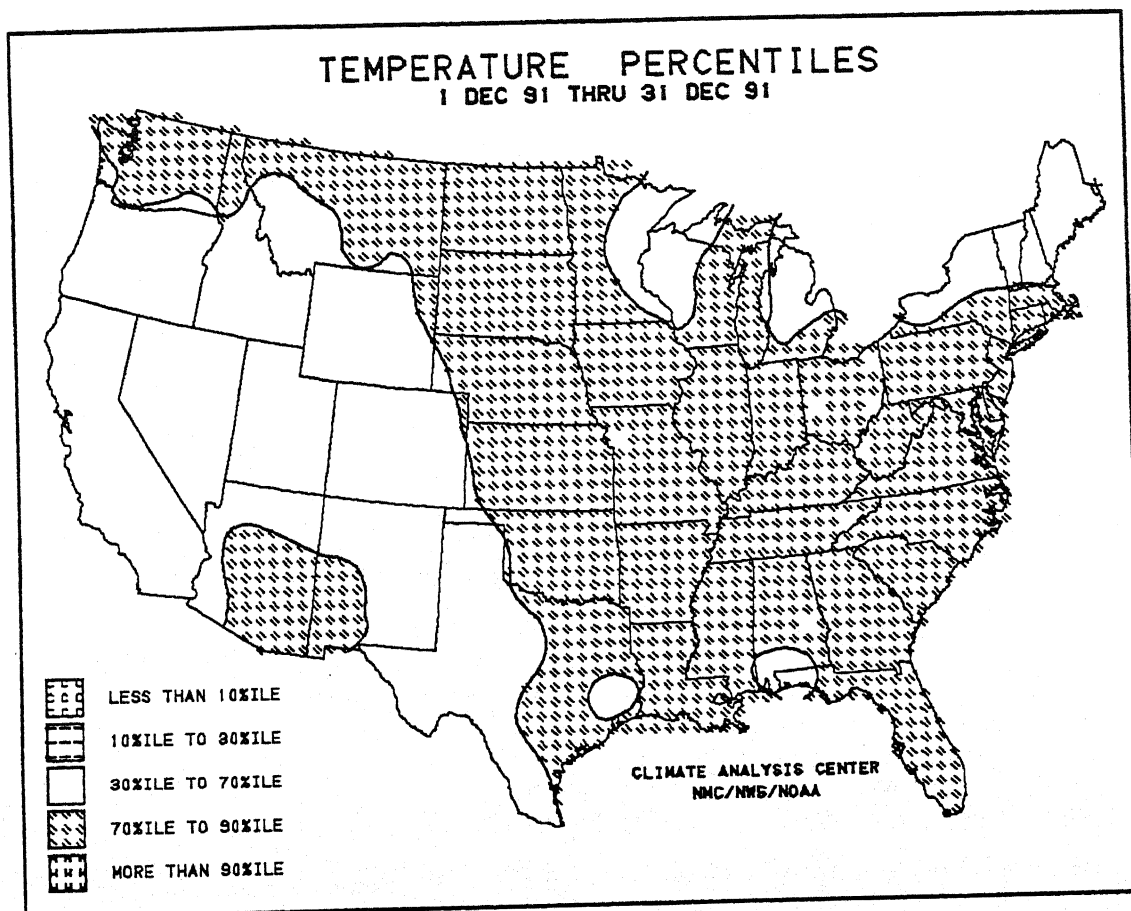


FIGURE 3. December 1991 Temperature Percentiles. Significant December warmth [$>70\%$] was observed over most of the eastern half of the country, the northwestern tier of states, and the desert Southwest. Substantially below normal December temperatures were absent nationwide.

TABLE 4. DECEMBER 1991 AVERAGE TEMPERATURE 2.0°F OR MORE BELOW NORMAL.

| STATION | DEPARTURE (°F) | AVERAGE (°F) | STATION | DEPARTURE (°F) | AVERAGE (°F) |
|------------------|-------------------|-----------------|--------------------|-------------------|-----------------|
| ALAMOSA, CO | -13.3 | 5.2 | CARIBOU, ME | -2.5 | 13.5 |
| ROCK SPRINGS, WY | -6.1 | 16.4 | GRAND JUNCTION, CO | -2.3 | 26.2 |
| NOME, AK | -4.3 | 0.3 | WINSLOW, AZ | -2.3 | 30.7 |
| PRICE, UT | -3.4 | 23.6 | LANDER, WY | -2.2 | 20.8 |
| BANGOR, ME | -3.2 | 19.8 | ST PAUL ISLAND, AK | -2.1 | 26.5 |
| HOULTON, ME | -3.0 | 14.2 | OGDEN/HILL AFB, UT | -2.0 | 27.8 |
| EASTPORT, ME | -2.6 | 25.0 | CALIENTE, NV | -2.0 | 32.0 |
| BETHEL, AK | -2.5 | 2.7 | | | |

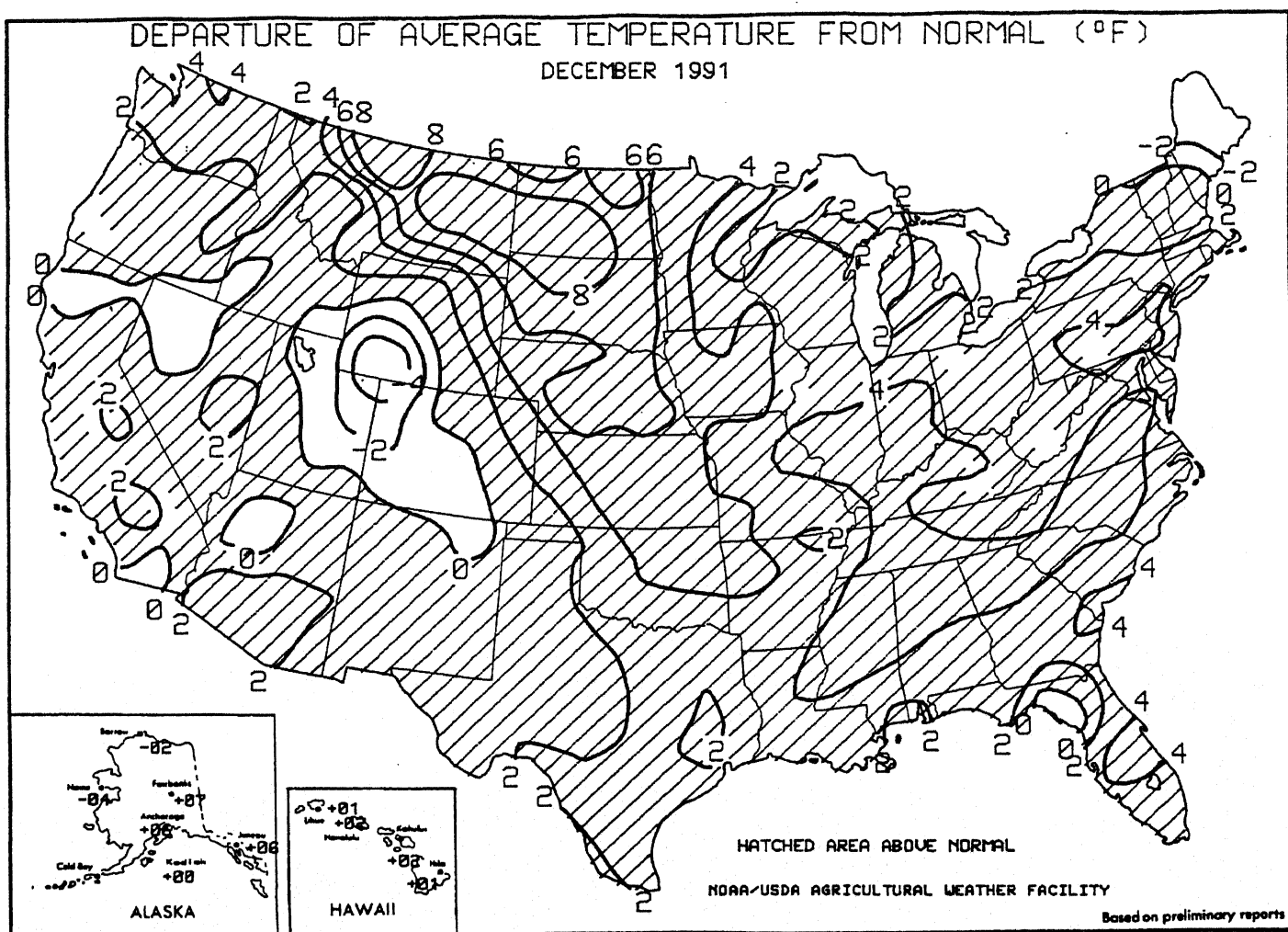


FIGURE 4. December 1991 Departure of Average Temperature from Normal (°F). Isotherms drawn only for -4°F, -2°F, 0°F, 2°F, 4°F, 6°F, and 8°F. Warmer than normal conditions encompassed most of the nation, with monthly departures of more than +8°F observed in the northern Plains. Below normal temperatures, with departures below -2°F, were restricted to the central Rockies and northern Maine.

TABLE 5. RECORD DECEMBER PRECIPITATION

| <u>STATION</u> | <u>TOTAL</u> (INCHES) | <u>NORMAL</u> (INCHES) | <u>PCT. OF</u> <u>NORMAL</u> | <u>RECORD</u> <u>TYPE</u> | <u>RECORDS</u> <u>BEGAN</u> |
|-----------------------|--------------------------|---------------------------|---------------------------------|------------------------------|--------------------------------|
| Austin, TX | 14.16 | 2.04 | 694.1 | HIGHEST | 1951 |
| San Antonio, TX | 13.96 | 1.36 | 1026.5 | HIGHEST | 1947 |
| Corpus Christi, TX | 9.80 | 1.21 | 809.9 | HIGHEST | 1888 |
| Houston, TX | 9.34 | 3.77 | 247.7 | HIGHEST | 1970 |
| Dallas-Fort Worth, TX | 8.75 | 1.71 | 511.7 | HIGHEST | 1947 |
| Waco, TX | 8.44 | 1.89 | 446.6 | HIGHEST | 1961 |
| Wichita Falls, TX | 6.93 | 1.20 | 577.5 | HIGHEST | 1951 |
| Beckley, WV | 6.43 | 3.12 | 206.1 | HIGHEST | 1953 |
| San Angelo, TX | 3.98 | 0.62 | 641.9 | HIGHEST | 1951 |
| Del Rio, TX | 3.07 | 0.55 | 558.2 | HIGHEST | 1963 |
| Roswell, NM | 2.63 | 0.39 | 674.4 | HIGHEST | 1951 |
| Lubbock, TX | 2.24 | 0.41 | 546.3 | HIGHEST | 1951 |
| Scottsbluff, NE | 0.02 | 0.51 | 3.9 | LOWEST | 1943 |
| Lewistown, MT | 0.00 | 0.77 | 0.0 | LOWEST | 1951 |
| Fort Collins, CO | 0.00 | 0.45 | 0.0 | LOWEST | 1951 |
| Sidney, NE | 0.00 | 0.42 | 0.0 | LOWEST | 1951 |
| Dickinson, ND | 0.00 | 0.36 | 0.0 | LOWEST | 1951 |
| Cut Bank, MT | 0.00 | 0.35 | 0.0 | LOWEST | 1951 |
| Valentine, NE | 0.00 | 0.33 | 0.0 | LOWEST | 1886 |

NOTE: Trace precipitation is considered ZERO precipitation. Stations with no precipitation are only included if normal precipitation is 0.25 inches or more.

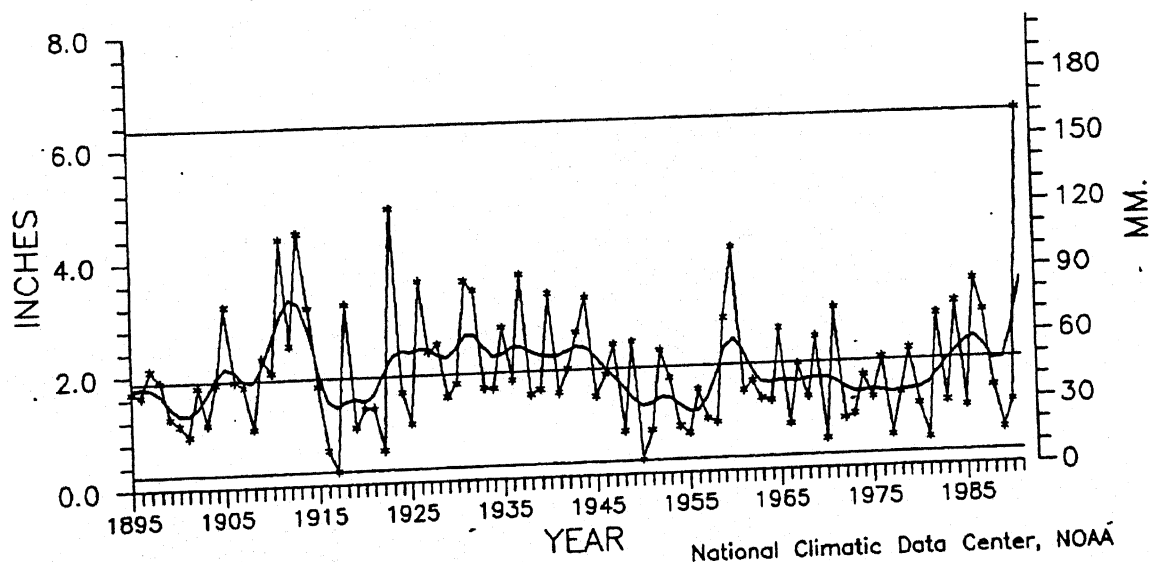
TABLE 6. RECORD DECEMBER AVERAGE TEMPERATURE

| <u>STATION</u> | <u>DEPNML (F)</u> | <u>AVGT (F)</u> | <u>NMLT (F)</u> | <u>TYPE</u> | <u>RECORDS</u> |
|--------------------|-------------------|-----------------|-----------------|-------------|----------------|
| Annette Island, AK | +5.7 | 41.3 | 35.6 | HIGHEST | 1941 |

TABLE 7. RECORD DECEMBER EXTREME TEMPERATURES.

| <u>STATION</u> | <u>EXTREME</u> (°F) | <u>DATE</u> | <u>RECORD</u> <u>TYPE</u> | <u>RECORDS</u> <u>BEGAN</u> |
|-------------------|------------------------|-------------|------------------------------|--------------------------------|
| Kahului, Maui, HI | 90 | DEC 13 | HIGHEST | 1942 |
| Tampa, FL | 86 | DEC 2 | HIGHEST | 1941 |
| Jacksonville, FL | 84 | DEC 2 | HIGHEST | 1942 |
| Norfolk, VA | 80 | DEC 3 | HIGHEST | 1949 |
| Atlanta, GA | 79 | DEC 1 | HIGHEST | 1935 |
| Cape Hatteras, NC | 78 | DEC 3 | HIGHEST | 1958 |
| Springfield, MO | 77 | DEC 8 | HIGHEST | 1946 |
| Columbia, MO | 76 | DEC 8 | HIGHEST | 1969 |

**TEXAS PRECIPITATION
DECEMBER, 1895-1991**



Precipitation in Texas averaged over a half a foot for December 1991, by far the highest amount ever recorded. Numerous individual rainfall totals in excess of a foot for the month were reported.

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Numbers refer to week of publication in the *Weekly Climate Bulletin*.

* Indicates a **Special Climate Summary** was published.

